

### **REMARKS**

Claims 1, 14, 18-23 and 29 are amended herein, and claims 6, 8, 28 and 34 are canceled. Table 4, on page 22 of the specification, has also been amended.

Claims 1-3, 5, 7, 10-24, 26-27, 29, 31-33 and 35-38 are pending. Reconsideration of this application, as amended, is requested.

A Request for Continued Examination is filed herewith.

#### **Amendment to Table 4**

Table 4, specifically, the description of Example 9, has been amended to correct an obvious typographical error. The mineral particle size has been corrected to be "300 micrometers" rather than "85 micrometers".

That Example 9 should be listed as having 300 micrometers rather than 85 micrometers is obvious to one when reviewing the entire application. In Table 4, Example 9 is listed as having "80 CAO", which is defined in Table 1 as "ceramic aluminum oxide, grade 80 (approx. 300 micrometers average particle size)." All of the other abrasive particle sizes listed in Table 4 are either 30 micrometers, 40 micrometers, 100-110 micrometers, 300 micrometers, or 400 micrometers. Further, the Examples compare similar abrasive articles that differ only by the height of the abrasive composite; see, for example, Examples 5 and 6, and Examples 7 and 8. Similarly, Example 9 differs from Example 10 only by height of the abrasive composite. Still further, the paragraph in the application (page 29-30) that describes the testing of Example 9, recites that the "test results ... show improved cut consistency, improved finish consistency, and extended life of the abrasive article having large topography and large ceramic particles when compared to a conventional agglomerate abrasive article." (emphasis added). Examples 10 and 11 have 300 micrometer abrasive particles.

At least for these reasons, Applicants believe that listing Example 9 as having 85 micrometer particles is an obvious typographical error, and that the correct size of 300 micrometers is readily discernible from the application, and that no new matter is being added to the application by this amendment.

### **112 Rejections**

Claim 28 was rejected under 35 U.S.C. 112, second paragraph. Claim 28 has been canceled, rendering this rejection moot.

### **103 Rejections**

The claims remain rejected under 35 U.S.C. 103(a) as unpatentable over Hoopman et al. ('248) in view of Abrahamson and also over Hoopman et al. ('217) in view of Abrahamson. Although Applicants disagree with these rejections, the claims have been amended to better define the abrasive articles and the methods as those illustrated in the working examples of this application.

The claims, in general, have been directed to abrasive articles having abrasive composites with ceramic aluminum oxide abrasive grains having an average particle size of about 300-400 micrometers. The composites have a height of 635-1016 micrometers and have faces that are at least partially parabolic. Some dependent claims recite an average particle size of about 300 micrometers. Other dependent claims recite a composite height of at least 750 micrometers.

The Office Action stressed that Applicants' previous arguments, based on the Examples in the application and the Declaration, were not persuasive because Applicants had not clearly established criticality for the values to establish unexpected results. Applicants contend that the Examples and test results for abrasive articles having these amended criteria show an unexpected performance improvement over the broad disclosures of Hoopman et al. ('248) and Hoopman et al. ('217).

The Examiner's attention is directed to the following examples from the originally filed application. Only Examples 1, 2, 9, 10 and 12 fall within the now-claimed scope of the abrasive articles and the claimed methods.

Ex.	mineral type	mineral size, $\mu\text{m}$	composite height, $\mu\text{m}$	composite shape	$\Delta\%$ , initial cut v. final cut
1	ceramic $\text{Al}_2\text{O}_3$	300	635	at least partially parabolic	6.9
2	ceramic $\text{Al}_2\text{O}_3$	400	762	at least partially parabolic	12.9
9	ceramic $\text{Al}_2\text{O}_3$	300	762	at least partially parabolic	9.1

10	ceramic Al <sub>2</sub> O <sub>3</sub>	300	1016	at least partially parabolic	12.4
12	ceramic Al <sub>2</sub> O <sub>3</sub>	400	1016	at least partially parabolic	13.2

Examples 1, 2, 9, 10 and 12 each has physical characteristics that fall within the scope of the claims: composites with ceramic aluminum oxide abrasive grains with an average particle size of about 300-400 micrometers, the composites having a height of 635-1016 micrometers and faces that are at least partially parabolic.

From Table 9 of the application, one can clearly see that all of the abrasive products that do not fall within the current definition of the abrasive article have a significantly greater change from the initial cut to the final cut than Examples 1, 2, 9, 10 and 12. Each of Examples 1, 2, 9, 10 and 12 has changes in cut of less than 20%, whereas the other abrasive articles have cut changes that are significantly greater.

Regarding specific claims, Examples 1 and 2 were tested using Test Procedure I. Although Example 1 was not tested the full test length, the cut change for Example 2 is within the requirements of claim 18, which recites that, using Test Procedure I, the abrasive article produces a first cut rate at Cycle 1 and a second cut rate at Cycle 240, the second cut rate being no greater than 15% less than the first cut rate.

Examples 9, 10 and 12 were tested using Test Procedure III. Each of these abrasive articles is within the requirements of claim 21, which recites that, the abrasive article, when using Test Procedure III, has a cut rate decrease over 60 cycles of no more than 50% of a comparative cut rate decrease, wherein the comparative cut rate decrease is obtained by a conventional coated abrasive with make and size coats and gravity deposited fused aluminum oxide abrasive particle agglomerates using Test Procedure III.

These specific examples, Examples 1, 2, 9, 10 and 12, illustrate that the abrasive articles of this invention, now narrowed to having composites with ceramic aluminum oxide abrasive grains with an average particle size of about 300-400 micrometers, the composites having a height of 635-1016 micrometers and faces that are at least partially parabolic, do not experience the usual decrease in cut rate performance over time, as is seen in the Hoopman patents, and thus result in a greater total cut. It is the combination of the various features that provides improved cut performance over time. Applicants contend that it would not have been obvious that the

specific combination of physical characteristics would be able to provide such improved grinding results over other abrasive articles that do not have those features.

Applicants believe that the claims, as amended, are patentable, and request withdrawal of the rejections.

**Summary**

In view of the above amendments and remarks, Applicants respectfully request a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone Applicants' attorney Dan Biesterveld, Reg. No. 45,898, at 651.737.3193.

Respectfully submitted,

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